Cerebral cavernous malformation

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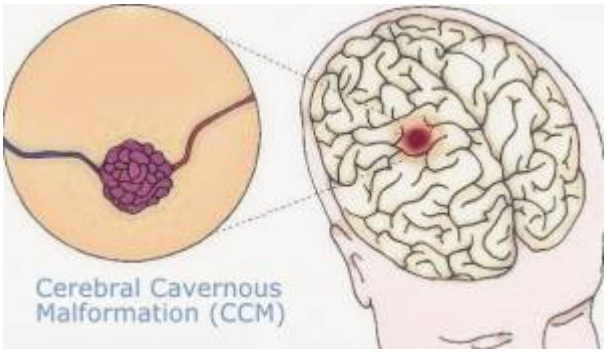
Cerebral cavernous malformations (CCMs) are intracranial lesions comprised of low flow and abnormally dilated capillary endothelial channels with increased permeability that predispose these vessels to episodes of thrombosis and focal hemorrhage, resulting in seizures and neurologic deficits.



Molecular targets

There is a grave need for the identification of molecular targets for therapeutic treatment and biomarkers as risk predictors for hemorrhagic stroke prevention. Based on reported various perturbed angiogenic signaling cascades mediated by the CCM signaling complex (CSC), there have been many proposed candidate drugs, targeting potentially angiogenic-relevant signaling pathways dysregulated by loss of function of one of the CCM proteins, which might not be enough to correct the pathological phenotype, hemorrhagic CCMs [1)]

Epidemiology

Cavernomas comprise 8%-15% of intracranial vascular lesions, usually supratentorial in location and superficial.

Of 164 cerebral cavernous hemangiomas may be found in every age group including the neonatal period. The sex incidence is equal. In 126 cases (76.8%) the cavernomas were of supratentorial, in 34 cases (20.7%) of infratentorial site, and in 4 more cases (2.5%) there was multiple occurence of supratentorial and posterior fossa cavernous haemangiomas [2].

see Cerebral cavernous malformation of the occipital lobe.

25% of them occur in the pediatric age group [3].

see also Pediatric Cavernous Malformation.

Classification

Cerebral cavernous malformation classification.

Etiology

Cerebral cavernous malformation etiology.

Pathogenesis

Cerebral cavernous malformation pathogenesis

Complications

see Intracranial hemorrhage from cerebral cavernous malformation

Clinical features

As an autosomal dominant disorder with incomplete penetrance, the majority of CCMs gene mutation carriers are largely asymptomatic but when symptoms occur, the disease has typically reached the stage of focal hemorrhage with irreversible brain damage, while the molecular “trigger” initiating the occurrence of CCM pathology remain elusive [4]

Cerebral cavernous malformations (CMs) are a source of neurological morbidity from seizures and focal neurological deficits due to mass effect and hemorrhage.

Diagnosis

Cerebral cavernous malformation diagnosis.

Treatment

see Cerebral cavernous malformation treatment.

Prognosis

Cerebral cavernous malformation prognosis.

Research

Li et al. developed a model of CCM formation that closely reproduces key events in human CCM formation through inducible CCM loss-of-function and PIK3CA gain-of-function in mature mice. In the present study, they used this model to test the ability of rapamycin, a clinically approved inhibitor of the PI3K effector mTORC1, to treat rapidly growing CCMs.

They show that both intraperitoneal and oral administration of rapamycin arrests CCM growth reduces perilesional iron deposition, and improves vascular perfusion within CCMs.

The findings further establish this adult CCM model as a valuable preclinical model and support clinical testing of rapamycin to treat rapidly growing human CCMs [5].

Case series

Cerebral cavernous malformation case series

Case reports

Tuleasca et al. present the pre-, per-, and postoperative course of an inferior parietal cavernous malformation, located in eloquent area, in a 27-year-old right-handed Caucasian male, presenting with intralesional hemorrhage and epilepsy. Preoperative diffusion tensor imaging has shown the cavernous malformation at the interface between the arcuate fasciculus and the inferior fronto-

occipital fasciculus. They describe the microsurgical approach, combining preoperative diffusion tensor imaging, neuronavigation, awake microsurgical resection, and intraoperative magnetic resonance imaging.

Complete microsurgical en bloc resection has been performed and is feasible even in eloquent locations. Intraoperative magnetic resonance imaging was considered an important adjunct, particularly used in this case as the patient moved during the "awake" phase of the surgery and thus neuronavigation was not accurate anymore. Postoperative course was marked by a unique, generalized seizure without any adverse event. Immediate and 3 months postoperative magnetic resonance imaging confirmed the absence of any residue. Pre- and postoperative neuropsychological exams were unremarkable [6)]

A patient who underwent subtotal resection of posterior fossa medulloblastoma with subsequent chemotherapy and radiotherapy at the age of 10 years. A new lesion in the region of the left foramen of Monro appeared 16 years later. Based on the imaging results, metastases or radiation-induced cavernoma was considered. The lesion had the same appearance on imaging as a rarely published intraventricular cavernoma of the foramen of Monro. Unlike the cavernoma of the foramen of Monro, this lesion was subependymal and intraforniceal. Using electromagnetic navigation and neuroendoscopy, the lesion was completely removed. Histopathological examination revealed a cavernous haemangioma.

This is a unique case of intraforniceal paraforaminal cavernoma that was successfully removed endoscopically using electromagnetic neuronavigation and without neurological sequelae. [7)].

[1)], [4)]
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